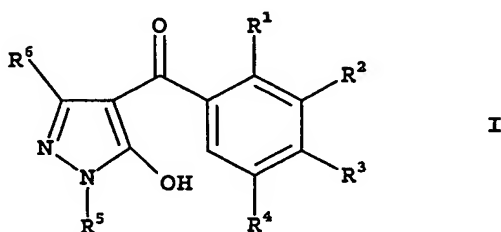


We claim:

1. A synergistic herbicidal mixture comprising

5 A) at least one 3-heterocycl-yl-substituted benzoyl derivative of the formula I



10 in which the variables have the following meanings:

R<sup>1</sup>, R<sup>3</sup> are halogen, C<sub>1</sub>-C<sub>6</sub>-alkyl, C<sub>1</sub>-C<sub>6</sub>-haloalkyl, C<sub>1</sub>-C<sub>6</sub>-alkoxy, C<sub>1</sub>-C<sub>6</sub>-haloalkoxy, C<sub>1</sub>-C<sub>6</sub>-alkylthio, C<sub>1</sub>-C<sub>6</sub>-alkylsulfinyl or C<sub>1</sub>-C<sub>6</sub>-alkylsulfonyl;

15 R<sup>2</sup> is a heterocyclic radical selected from the group: isoxazol-3-yl, isoxazol-4-yl, isoxazol-5-yl, 4,5-dihydroisoxazol-3-yl, 4,5-dihydroisoxazol-4-yl and 4,5-dihydroisoxazol-5-yl, it being possible for  
20 the six radicals mentioned to be unsubstituted or mono- or polysubstituted by halogen, C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy, C<sub>1</sub>-C<sub>4</sub>-haloalkyl, C<sub>1</sub>-C<sub>4</sub>-haloalkoxy or C<sub>1</sub>-C<sub>4</sub>-alkylthio;

25 R<sup>4</sup> is hydrogen, halogen or C<sub>1</sub>-C<sub>6</sub>-alkyl;

R<sup>5</sup> is C<sub>1</sub>-C<sub>6</sub>-alkyl;

R<sup>6</sup> is hydrogen or C<sub>1</sub>-C<sub>6</sub>-alkyl;

30 or one of its environmentally compatible salts;

and

B) two herbicides selected from the group including imazapyr, imazaquin, imazamethabenz-methyl, imazamox, imazapic and imazethapyr;

5 or one of its environmentally compatible salts;

and, if desired,

10 C) at least one herbicidal compound from the group of the acetyl-CoA carboxylase inhibitors (ACC), acetolactate synthase inhibitors (ALS), amides, auxin herbicides, auxin transport inhibitors, carotenoid biosynthesis inhibitors, enolpyruvylshikimate 3-phosphate synthase inhibitors (EPSPS), glutamine synthetase inhibitors,  
15 lipid biosynthesis inhibitors, mitosis inhibitors, protoporphyrinogen IX oxidase inhibitors, photosynthesis inhibitors, synergists, growth substances, cell wall biosynthesis inhibitors and a variety of other herbicides;

20

in a synergistically effective amount.

2. A synergistic herbicidal mixture as claimed in claims 1,  
25 comprising, as component A), a 3-heterocyclyl-substituted benzoyl derivative of the formula I, where R<sup>4</sup> is hydrogen.

3. A synergistic herbicidal mixture as claimed in any of claims 1 to 2, comprising, as component A), a 3-heterocyclyl-substituted benzoyl derivative of the formula I, where  
30

R<sup>1</sup> is halogen, C<sub>1</sub>-C<sub>6</sub>-alkyl or C<sub>1</sub>-C<sub>6</sub>-alkylsulfonyl;

R<sup>3</sup> is halogen or C<sub>1</sub>-C<sub>6</sub>-alkylsulfonyl;

35

4. A synergistic herbicidal mixture as claimed in any of claims 1 to 3, comprising, as component A), a 3-heterocyclyl-substituted benzoyl derivative of the formula I, where

R<sup>2</sup> is a heterocyclic radical selected from the group:  
isoxazol-3-yl, isoxazol-5-yl and 4,5-dihydroisoxazol-3-yl, it being possible for the three radicals mentioned to be unsubstituted or mono- or polysubstituted by  
5 halogen, C<sub>1</sub>-C<sub>4</sub>-alkyl, C<sub>1</sub>-C<sub>4</sub>-alkoxy, C<sub>1</sub>-C<sub>4</sub>-haloalkyl, C<sub>1</sub>-C<sub>4</sub>-haloalkoxy or C<sub>1</sub>-C<sub>4</sub>-alkylthio.

5. A synergistic herbicidal mixture as claimed in any of claims 1 to 4, comprising, as component A), a 3-heterocyclyl-substituted benzoyl derivative of the formula I, where  
10

R<sup>2</sup> is isoxazol-5-yl, 3-methyl-isoxazol-5-yl, 4,5-dihydroisoxazol-3-yl, 5-methyl-4,5-dihydroisoxazol-3-yl, 5-ethyl-4,5-dihydroisoxazol-3-yl or 4,5-dimethyl-4,5-dihydroisoxazol-3-yl.  
15

6. A synergistic herbicidal mixture as claimed in any of claims 1 to 5, comprising, as component A), 4-[2-chloro-3-(4,5-dihydroisoxazol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-pyrazole.  
20

7. A synergistic herbicidal mixture as claimed in any of claims 1 to 5, comprising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxazol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-pyrazole.  
25

8. A synergistic herbicidal mixture as claimed in any of claims 1 to 7, comprising as component B) imazapyr and imazethapyr.

- 30 9. A synergistic herbicidal mixture as claimed in any of claims 1 to 7, comprising as component B) imazapic and imazapyr.

10. A synergistic herbicidal mixture as claimed in any of claims 1 to 7, comprising, three active ingredients, a 3-heterocyclyl-substituted benzoyl derivative of the formula I (component A) as claimed in claims 1 to 7 and imazapyr and imazethapyr (component B).  
35

11. A synergistic herbicidal mixture as claimed in any of claims 1 to 7, comprising, three active ingredients, a 3-heterocyclyl-substituted benzoyl derivative of the formula I (component A) as claimed in claims 1 to 7 and imazapic and imazapyr (component B).
12. A synergistic herbicidal mixture as claimed in any of claims 1 to 7, comprising, at least four active ingredients, a 3-heterocyclyl-substituted benzoyl derivative of the formula I (component A) as claimed in claims 1 to 7; two herbicides selected from the group including imazapyr, imazaquin, imazamethabenz-methyl, imazamox, imazapic and imazethapyr (component B) as claimed in claims 1; and
- C) at least one herbicidal compound from the group of the acetyl-CoA carboxylase inhibitors (ACC), acetolactate synthase inhibitors (ALS), amides, auxin herbicides, auxin transport inhibitors, carotenoid biosynthesis inhibitors, enolpyruvylshikimate 3-phosphate synthase inhibitors (EPSPS), glutamine synthetase inhibitors, lipid biosynthesis inhibitors, mitosis inhibitors, protoporphyrinogen IX oxidase inhibitors, photosynthesis inhibitors, synergists, growth substances, cell wall biosynthesis inhibitors and a variety of other herbicides.
13. A synergistic herbicidal mixture as claimed in claim 1 or 12 comprising, as component C), at least one herbicidal compound from the groups C1 to C16:
- C1 acetyl-CoA carboxylase inhibitors (ACC): cyclohexenone oxime ethers, phenoxyphenoxypropionic esters or arylaminopropionic acids;
- C2 acetolactate synthase inhibitors (ALS): imidazolinones, pyrimidyl ethers, sulfonamides or sulfonyleureas;

- C3 amides;
- C4 auxin herbicides:  
5 pyridinecarboxylic acids, 2,4-D or benazolin;
- C5 auxin transport inhibitors;
- C6 carotenoid biosynthesis inhibitors;  
10
- C7 enolpyruvylshikimate 3-phosphate synthase inhibitors  
(EPSPS);
- C8 glutamine synthetase inhibitors;  
15
- C9 lipid biosynthesis inhibitors:  
anilides, chloroacetanilides, thioureas, benfuresate or  
perfluidone;
- C10 mitosis inhibitors:  
20 carbamates, dinitroanilines, pyridines, butamifos,  
chlorthal-dimethyl (DCPA) or maleic hydrazide;
- C11 protoporphyrinogen IX oxidase inhibitors:  
25 diphenyl ethers, oxadiazoles, cyclic imides or pyra-  
zoles;
- C12 photosynthesis inhibitors:  
30 propanil, pyridate, pyridafol, benzothiadiazinones, di-  
nitrophenols, dipyridylenes, ureas, phenols, chlorida-  
zon, triazines, triazinones, uracils or biscarbamates;
- C13 synergists:  
oxiranes;  
35
- C14 growth substances:  
aryloxyalkanoic acids, benzoic acids or quinolinecar-  
boxylic acids;

C15 cell wall synthesis inhibitors:

C16 various other herbicides:

5 dichloropropionic acids, dihydrobenzofurans, phenylacetic acids or aziprotryn, barban, bensulide, benzthiazuron, benzofluor, buminafos, buthidazole, buturon, cafenstrole, chlorbufam, chlorofenprop-methyl, chlo-  
 10 roxuron, cinmethylin, cumyluron, cycluron, cyprazine, cyprazole, dibenzyluron, dipropetryn, dymron, eglina-  
 zin-ethyl, endothall, ethiozin, flucabazone, fluorben-  
 15 tranil, flupoxam, isocarbamid, isopropalin, karbuti-  
 late, mefluidide, monuron, napropamide, napropanilide, nitralin, oxaciclomefone, phenisopham, piperophos, pro-  
 cyazine, profluralin, pyributicarb, secbumeton, sulfal-  
 late (CDEC), terbucarb, triazofenamide, triaziflam or  
 trimeturon;

or their environmentally compatible salts.

20 14. A synergistic herbicidal mixture as claimed in claims 1 or 12, comprising, as component C), at least one herbicidal compound from the groups C1 to C16:

C1 acetyl-CoA carboxylase inhibitors (ACC):

25 - cyclohexenone oxime ethers:  
 alloxydim, clethodim, cloproxydim, cycloxydim,  
 sethoxydim, tralkoxydim, butroxydim, clefoxydim or  
 tepraloxydim;  
 - phenoxyphenoxypropionic esters:  
 30 clodinafop-propargyl (and, if appropriate, clo-  
 quintocet), cyhalofop-butyl, diclofop-methyl,  
 fenoxaprop-ethyl, fenoxaprop-P-ethyl, fen-  
 thiapropethyl, fluazifop-butyl, fluazifop-P-butyl,  
 haloxyfop-ethoxyethyl, haloxyfop-methyl, haloxy-  
 35 fop-P-methyl, isoxapyrifop, propaquizafop, qui-  
 zalofop-ethyl, quizalofop-P-ethyl or quizalofop-  
 tefuryl; or  
 - arylaminopropionic acids:  
 flamprop-methyl or flamprop-isopropyl;

## C2 acetolactate synthase inhibitors (ALS):

## - imidazolinones:

imazapyr, imazaquin, imazamethabenz-methyl, imazamox, imazapic or imazethapyr;

## - pyrimidyl ethers:

pyrithiobac-acid, pyrithiobac-sodium, bispyribac-sodium, KIH-6127 or pyribenzoxym;

## - sulfonamides:

florasulam, flumetsulam or metosulam; or

## - sulfonylureas:

amidosulfuron, azimsulfuron, bensulfuron-methyl, chlorimuron-ethyl, chlorsulfuron, cinosulfuron, cyclosulfamuron, ethametsulfuron-methyl, ethoxysulfuron, flazasulfuron, halosulfuron-methyl, imazosulfuron, metsulfuron-methyl, nicosulfuron, primisulfuron-methyl, prosulfuron, pyrazosulfuron-ethyl, rimsulfuron, sulfometuron-methyl, thifensulfuron-methyl, triasulfuron, tribenuron-methyl, triflurosulfuron-methyl, N-[[[4-methoxy-6-(trifluoromethyl)-1,3,5-triazin-2-yl]amino]-carbonyl]-2-(trifluoromethyl)-benzenesulfonamide, sulfosulfuron or iodosulfuron;

## C3 amides:

- allidochlor (CDAA), benzoylprop-ethyl, bromobutide, chlorthiamid, diphenamid, etobenzanid (benzchlomet), fluthiamide, fosamin or monalide;

## C4 auxin herbicides:

## - pyridine carboxylic acids:

clopyralid or picloram; or

## - 2,4-D or benazolin;

## C5 auxin transport inhibitors:

- naptalame or diflufenzopyr;

## C6 carotenoid biosynthesis inhibitors:

- 5                   -    benzofenap, clomazone (dimethazone), diflufenican,  
                    fluorochloridone, fluridone, pyrazolynate, pyra-  
                    zoxifen, isoxaflutole, isoxachlortole, mesotrione,  
                    sulcotrione (chlormesulone), ketospiradox, flurta-  
                    mone, norflurazon or amitrol;
- 10           C7    enolpyruvylshikimate-3-phosphate synthase inhibitors  
              (EPSPS):  
              -    glyphosate or sulfosate;
- C8    glutamine synthetase inhibitors:  
              -    bilanafos (bialaphos) or glufosinate-ammonium;
- 15           C9    lipid biosynthesis inhibitors:  
              -    anilides:  
                    anilofos or mefenacet;  
              -    chloroacetanilides:  
                    dimethenamid, S-dimethenamid, acetochlor,  
                    alachlor, butachlor, butenachlor, diethatyl-ethyl,  
20                dimethachlor, metazachlor, metolachlor, S-  
                    metolachlor, pretilachlor, propachlor, prynachlor,  
                    terbuchlor, thenylchlor or xylachlor;  
              -    thioureas:  
                    butylate, cycloate, di-allate, dimepiperate, EPTC,  
25                esprocarb, molinate, pebulate, prosulfocarb,  
                    thiobencarb (benthocarb), tri-allate or ver-  
                    nolate; or  
              -    benfuresate or perfluidone;
- 30           C10   mitosis inhibitors:  
              -    carbamates:  
                    asulam, carbetamid, chlorpropham, orbencarb,  
                    pronamid (propyzamid), propham or tiocarbazil;  
              -    dinitroanilines:  
35                benefin, butralin, dinitramin, ethalfluralin, flu-  
                    chloralin, oryzalin, pendimethalin, prodiamine or  
                    trifluralin;  
              -    pyridines:  
                    dithiopyr or thiazopyr; or



- butamifos, chlorthal-dimethyl (DCPA) or maleic hydrazide;

C11 protoporphyrinogen IX oxidase inhibitors:

- 5 - diphenyl ethers:  
acifluorfen, acifluorfen-sodium, aclonifen,  
bifenox, chlornitrofen (CNP), ethoxyfen, fluoro-  
difen, fluoroglycofen-ethyl, fomesafen, furyloxy-  
10 fen, lactofen, nitrofen, nitrofluorfen or oxy-  
fluorfen;
- oxadiazoles:  
oxadiargyl or oxadiazon;
- cyclic imides:  
15 azafenidin, butafenacil, carfentrazone-ethyl,  
cinidon-ethyl, flumiclorac-pentyl, flumioxazin,  
flumipropyn, flupropacil, fluthiacet-methyl, sul-  
fentrazone or thidiazimin; or
- pyrazoles:  
20 ET-751, JV 485 or nipyraclufen;

C12 photosynthesis inhibitors:

- propanil, pyridate or pyridafol;
- benzothiadiazinones:  
bentazone;
- 25 - dinitrophenols:  
bromofenoxim, dinoseb, dinoseb-acetate, dinoterb  
or DNOC;
- dipyridylenes:  
30 cyperquat-chloride, difenzoquat-methylsulfate,  
diquat or paraquat-dichloride;
- ureas:  
chlorbromuron, chlorotoluron, difenoxuron, dimefu-  
ron, diuron, ethidimuron, fenuron, fluometuron,  
isoproturon, isouron, linuron, methabenzthiazuron,  
35 methazole, metobenzuron, metoxuron, monolinuron,  
neburon, siduron or tebuthiuron;
- phenols:  
bromoxynil or ioxynil;
- chloridazon;

- triazines:  
ametryn, atrazine, cyanazine, desmetryn, di-  
methamethryn, hexazinone, prometon, prometryn,  
propazine, simazine, simetryn, terbumeton, ter-  
butryn, terbutylazine or trietazine;
  - triazinones:  
metamitron or metribuzine;
  - uracils:  
bromacil, lenacil or terbacil; or
  - biscarbamates:  
desmedipham or phenmedipham;
- C13 synergists:
- oxiranes:
  - tridiphanes;
- C14 growth substances:
- aryloxyalkanoic acids:  
2,4-DB, clomeprop, dichlorprop, dichlorprop-P  
(2,4-DP-P), fluoroxypyr, MCPA, MCPB, mecoprop, me-  
coprop-P, or triclopyr;
  - benzoic acids:  
chloramben or dicamba; or
  - quinolinecarboxylic acids:  
quinclorac or quinmerac;
- C15 cell wall synthesis inhibitors:
- isoxaben or dichlobenil;
- C16 various other herbicides:
- dichloropropionic acids:  
dalapon;
  - dihydrobenzofurans:  
ethofumesate;
  - phenylacetic acids:  
chlorfenac (fenac); or
  - aziprotryn, barban, bensulide, benzthiazuron, ben-  
zofluor, buminafos, buthidazole, buturon, cafen-  
strole, chlorbufam, chlorfenprop-methyl, chlo-

roxuron, cinmethylin, cumyluron, cycluron,  
cyprazine, cyprazole, dibenzyluron, dipropetryn,  
dymron, eglinazin-ethyl, endothall, ethiozin, flu-  
cabazone, fluorbentranil, flupoxam, isocarbamid,  
5 isopropalin, karbutilate, mefluidide, monuron,  
napropamide, napropanilide, nitralin, oxaciclome-  
fone, phenisopham, piperophos, procyazine, proflu-  
ralin, pyributicarb, secbumeton, sulfallate  
(CDEC), terbucarb, triazofenamid, triaziflan or  
10 trimeturon;

or their environmentally compatible salts.

- 15 15. A synergistic herbicidal mixture as claimed in 12, compris-  
ing, as component C), at least one herbicidal compound from  
the groups C9 or C12 as defined in claim 12.
- 20 16. A synergistic herbicidal mixture as claimed in claim 12  
comprising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxa-  
zol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-  
pyrazole; as component B) two herbicides selected from the  
group including imazapyr, imazaquin, imazamethabenz-methyl,  
imazamox, imazapic and imazethapyr; and as component C) a  
herbicidal compound from the group C9.
- 25 17. A synergistic herbicidal mixture as claimed in claim 12  
comprising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxa-  
zol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-  
pyrazole, as component B) imazapyr and imazethapyr or ima-  
30 zapic and imazapyr, and as component C) a chloroacetanilide.
18. A synergistic herbicidal mixture as claimed in claim 12 com-  
prising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxa-  
zol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-  
35 pyrazole, as component B) imazapyr and imazethapyr as compo-  
nent C) acetochlor.
19. A synergistic herbicidal mixture as claimed in claim 12 com-  
prising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxa-

zol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-pyrazole, as component B) imazapic and imazapyr, and as component C) acetochlor.

- 5 20. A synergistic herbicidal mixture as claimed in claim 12 comprising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxazol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-pyrazole; as component B) two herbicides selected from the group including imazapyr, imazaquin, imazamethabenz-methyl, 10 imazamox, imazapic and imazethapyr; and as component C) a herbicidal compound from the group C12.
- 15 21. A synergistic herbicidal mixture as claimed in claim 12 comprising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxazol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-pyrazole, as component B) imazapyr and imazethapyr, and as component C) a benzothiadiazone or a triazine.
- 20 22. A synergistic herbicidal mixture as claimed in claim 12 comprising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxazol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-pyrazole, as component B) imazapyr and imazethapyr, and as component C) bentazone.
- 25 23. A synergistic herbicidal mixture as claimed in claim 12 comprising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxazol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-pyrazole, as component B) imazapyr and imazethapyr as component C) atrazine.
- 30 24. A synergistic herbicidal mixture as claimed in claim 12 comprising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxazol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-pyrazole, as component B) imazapic and imazapyr, and as component C) a benzothiadiazone or a triazine.
- 35 25. A synergistic herbicidal mixture as claimed in claim 12 comprising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxazol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-

pyrazole, as component B) imazapic and imazapyr, and as component C) bentazone.

26. A synergistic herbicidal mixture as claimed in claim 12  
5 comprising, as component A) 4-[2-methyl-3-(4,5-dihydroisoxazol-3-yl)-4-methylsulfonyl-benzoyl]-1-methyl-5-hydroxy-1H-pyrazole, as component B) imazapic and imazapyr as component C) atrazine.
- 10 27. Synergistic herbicidal mixture as claimed in any of claims 1 to 26, wherein component A) and B) are present in a weight ratio of 1:0.001 to 1:500.
- 15 28. Synergistic herbicidal mixture as claimed in any of claims 12 to 26, wherein component A) and component C) are present in a weight ratio of 1:0.002 to 1:800.
- 20 29. A herbicidal composition comprising a herbicidally active amount of a synergistic herbicidal mixture as claimed in any of claims 1 to 28, at least one inert liquid and/or solid carrier and, if desired, at least one surfactant.
- 25 30. A process for the preparation of herbicidal compositions as claimed in claim 29, wherein component A), component B), if desired, component C), at least one inert liquid and/or solid carrier and, if appropriate, a surfactant are mixed.
- 30 31. A method of controlling undesired vegetation, which comprises applying a synergistic herbicidal mixture as claimed in any of claims 1 to 28 before, during and/or after the emergence of undesired plants, it being possible for the herbicidally active compounds of components A), B) and, if desired, C) to be applied simultaneously or in succession.
- 35 32. A method of controlling undesired vegetation as claimed in claim 31, wherein the leaves of the crop plants and of the undesired plants are treated.